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ABSTRACT

Studies have shown that the single greatest factor affecting student satisfaction in distance education courses is the amount of interaction that occurs between teacher and students. New technologies have expanded the potential for interaction between students and instructors, but meaningful interaction that contributes to student growth and learning requires careful planning on the part of the instructor. Two sections of a graduate level instructional technology course delivered via video teleconferencing and online instruction were examined for instructional strategies that were used to build interaction. In addition, the effectiveness of the strategies and student responses to the interaction were explored. Meaningful interaction was achieved in the categories of learner-content, learner-learner, and learner-instructor. This was achieved through the instructor's careful planning of collaborative course activities that were specifically designed to support course objectives. Students were taught to use the interactive technologies (e-mail, bulletin board, chat) before they were required to use them, and these skills were reinforced and refined as the course progressed and the students became more proficient in using the technologies. The greatest problem appeared to be the delayed and limited feedback the instructor was able to provide regarding assignments. (Author/AEF)

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Building Interaction in Online and Distance Education Courses

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Abstract: Studies have shown that the single greatest factor affecting student satisfaction in distance education courses is the amount of interaction that occurs between teacher and students. New technologies have expanded the potential for interaction between students and instructors, but meaningful interaction that contributes to student growth and learning requires careful planning on the part of the instructor. Two sections of a graduate level instructional technology course delivered via video teleconferencing and online instruction were examined for instructional strategies that were used to build interaction. In addition, the effectiveness of the strategies and student responses to the interaction were explored.

Introduction

The earliest distance education courses, including correspondence, radio, and television broadcast courses, were generally limited in the nature and amount of interaction that occurred between teachers and students. In most cases, the instructional delivery systems supported one-way, asynchronous (non-concurrent) communication. Teachers presented information to students who were isolated receivers of the course content via the mail, or some form of broadcast technology. Student feedback or responses to instructors, if it occurred, depended on return mail, or occasionally the telephone. This introduced an automatic delay into the communication interchange. Interaction between students rarely transpired, because most of the courses were designed to be independent study courses. Students were not aware of, or involved with, other students who might be enrolled in the same class (Moore & Kearsley 1996).

However, the current technology-based distance learning delivery systems, including video and computer conferencing, and other online course delivery options, provide students with a "far richer range of interaction, not only with the instructor, but also with other learners" (Heinich, Molenda, Russell, & Smaldino 1999, p. 277). This capability to provide increased interaction, including two-way, synchronous (concurrent) communication, is critical, since a number of studies have shown that the single greatest factor affecting student satisfaction in distance education courses is the amount of interaction between the teacher and the students (Fulford & Zhang 1993; Furst-Bowie 1997; Zirkin & Sumler 1995). And, as community and peer interaction have grown more important in traditional classrooms, distance educators have also recognized the learning benefits of collaboration and interaction between students in technology-mediated learning environments (Anderson & Garrison 1998; Anderson & Garrison 1995; Brown, Collins & Duguid 1989).

Moore & Kearsley (1996) identify three categories of interaction in distance education settings: learner-content interaction, learner-learner interaction, and learner-instructor interaction. Learner-content interaction refers to student involvement with course materials as they construct their own knowledge by accommodating new information into their existing cognitive structures. Learner-learner interaction includes individual one-one interchanges between students, as well as communication between small or large groups of students for collaboration, clarification, feedback and support. Learner-instructor interaction refers to communication between students and teachers for the purpose of creating and maintaining interest; presenting, clarifying or elaborating information; scaffolding learning; or providing feedback, evaluation, support, and encouragement.

Jonassen, Peck, & Wilson (1999) suggest that one-alone communication, such as individual student engagement with learning resources, can be facilitated in technology-supported learning environments through online databases, journals, and learning activities such as independent inquiry, research, writing, and browsing. One-one communication that occurs between an instructor and student, or two students, can be accommodated through email or one-one online chats. One-many communication can be supported through

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list-servs, bulletin boards, and online chats. Video-conferencing offers additional opportunities for one-one and one-many interchanges.

This paper describes how the three types of interaction identified by Moore & Kearsley (1996) were supported in a distance education environment using the technology resources identified by Jonassen, Peck, & Wilson (1999).

Methodology

Two sections of a one-semester graduate level instructional technology issues course were examined for the instructional strategies that were used to build learner-content, learner-learner, and learner-instructor interaction. One section of the course was delivered using video teleconferencing and online technologies, and the other section was delivered completely online. The course was offered at a teaching university in Georgia.

This course was selected because the course framework emphasized Proposition 5 from the National Board for Professional Teaching Standards (1998): Educators are members of learning communities. This suggested that strategies would be employed to support interaction between all class participants including the students and the instructor.

Data sources included the instructional framework and design for each section of the course, as well as the course materials (online web pages, bulletin boards, email, chats, videoconferences) themselves. Student reactions and instructor reflections were gathered throughout the course to provide additional information.

Course Description

The video/online section of the course was delivered using the Georgia Statewide Academic and Medical System (GSAMS) video-conferencing technology and WebCT online courseware. This section of the course met via GSAMS for two and one half hours one week and via WebCT the next week. The second section of the course was delivered completely via WebCT.

The GSAMS system is a compressed video system that supports two-way synchronous audio and video communication between participating sites. WebCT is a web-based courseware system that combines a number of online one-way and two-way asynchronous and synchronous applications including email, private and public bulletin boards, chat rooms, web pages, calendars, and quizzes/surveys. WebCT email supports two-way, asynchronous private communication between individual course participants using a private messaging system. WebCT bulletin boards support two-way, asynchronous communication between all class members (public bulletin boards) or between designated subsets of class members (private bulletin boards). Bulletin boards allow class members to post messages that can be read and responded to by other class members. Both the initial message and all responses are accessible to any class member cleared for access to a particular bulletin board. WebCT chat provides five chat rooms for two-way, synchronous communication between class members. Real-time concurrent dialog and conversations can be conducted in the chat areas. WebCT also provides one-way asynchronous communication support through Instructor Course Notes, Student Presentations, and Calendar web pages. The instructor or students can create and post web pages that communicate content information, class activities, assignments, etc. in these areas. The WebCT quiz/survey application provides a two-way, asynchronous tool for testing or anonymous surveying.

The GSAMS/WebCT class included the home, or originating site, and two remote sites. A total of 25 students participated in this class, although two students eventually dropped the course for medical reasons. The instructor and two students attended the home site, an additional two students attended a remote site approximately 30 miles south of the home site, and the remaining 21 students attended a remote site approximately 60 miles north of the home site. All participants in the class were regular or special ed teachers, media specialists, or instructional technologists in K-12 schools, and several of the participants worked at the same school. Many had taken classes together and were in essence proceeding through their degree programs as a cohort group.

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Twenty students were enrolled in the WebCT class. They participated from a variety of locations around the western/northwestern section of the state, but most participated from their individual homes. Class members included K-12 regular or special ed teachers, media specialists, and instructional technologists; and instructional technologists from post-secondary institutions and a technology training center. Only two class members worked at the same institution, and few had taken classes together.

Strategies for Supporting Interaction

The instructor used a four-step process to plan the course. First, course objectives were identified and student evaluation strategies were developed. Major course evaluation components included a self-reflective technology case study based on a daily technology journal each student kept during the course, a Technology Symposium presentation sharing a technology research or implementation project completed during the semester, participation in two class debates, design of a technology diffusion plan, design of a technology integration plan, presentation of a Technology Tip, and participation in all class activities. Readings and additional class activities that supported course objectives were also identified.

After the evaluation components and other class activities had been confirmed, each was analyzed to determine interaction, group, and time requirements. Interaction needs included the type of interaction required: one-way or two-way communication for information access or dissemination, discussion, collaboration, feedback, etc. Group requirements were based on whether the student needed to work alone, with a small group of other learners, with the entire class, or with the instructor. Time considerations encompassed whether the interaction needed to be synchronous or asynchronous. Supporting technologies (GSAMS, email, bulletin board, web pages, chat, etc.) were then selected to match the interaction, group, and time requirements of each evaluation component or activity.

During the implementation phase, the instructor introduced and guided students through each technology application prior to the time they were required to use the technology for a class activity. Students in both classes were required to attend a face-to-face orientation session on campus the first night of class. During this orientation, all students were introduced to and practiced using basic WebCT applications including accessing and printing Course Notes and Student Presentation web pages, sending and receiving email and attachments, reading and posting to the public and private bulletin boards, and participating in an informal chat room conversation. In subsequent online meetings, students were guided through more sophisticated use of the bulletin board and chat technologies through weekly postings on the Course Notes web pages and general bulletin board discussions. GSAMS students also received an orientation to the GSAMS videoconferencing including strategies for effective participation and presentations. Students in both courses were provided access to an online WebCT tutorial, online WebCT help, and a toll-free WebCT help desk telephone number.

Informal evaluation strategies were employed throughout both sections of the course. An Online Woes bulletin board was established to allow students to publicly discuss problems and difficulties they were experiencing in the course. This public forum provided feedback to the instructor about positive and negative student experiences, and enabled students to share frustrations and solutions with each other in regard to the online format. It also allowed them to see that different students experienced and reacted to the same online activities in a different manner. Some formative course adjustments were implemented based on feedback provided via the bulletin board. After each major course activity or evaluation component, students privately emailed the instructor their reflections on the activity or evaluation, how the technology supported the task, and problems/solutions they encountered. At the conclusion of the course, students completed a formal questionnaire concerning their experiences in the distance education course.

Learner-Content Interaction.

Students interacted with course content in a variety of ways, and frequently the interaction with course content also incorporated learner-learner interaction and learner-instructor interaction. In this sense, it is difficult to separate the three types of interaction and overlaps will be described as they occurred.

Students in both sections of the course received a printed syllabus during the orientation meeting. The syllabus outlined objectives, requirements, evaluation activities, and the course schedule of events. In addition, a link to the syllabus was posted on the WebCt course Home Page. A textbook reader was required for the course, but additional materials and readings were accessed through Course Notes web page links to a variety of online full-text periodicals available through the Georgia Library Learning Online (GALILEO) database, as well as other World Wide Web (WWW) resources. Each week, an instructor-developed Course Notes web page was posted on the WebCT course Home Page. The Course Notes web page reviewed the preceding week's activities, announced readings and assignments for the upcoming week, provided links to referenced materials, posted "lecture-type notes", and provided other information to guide students through their weekly activities. This Course Notes web page provided the framework for learner-content interaction.

In addition to required readings, each week one or two different students were required to present a Tech Tip to the rest of the class. The purpose of this activity was to inform students of new ways of using technology, provide troubleshooting tips, or acquaint them with resources with which they might not be familiar. Students presented Tech Tips in one of three ways: they created and posted a web page(s) containing their Tech Tip; they posted their Tech Tip to the Tech Tip bulletin board; or the GSAMS/WebCT students could do a Show and Tell about their Tech Tip on GSAMS. Unless the Tech Tip was presented on GSAMS, students accessed the Tech Tip independently. However, there was frequently a good deal of learner-learner interaction on the bulletin board after each new Tech Tip was presented. Students frequently commented on the helpfulness of the tip, suggested alternative strategies for accomplishing similar objectives, or asked for additional information.

Another major source of learner-content interaction was the Technology Symposium. At the end of the semester, a mini technology conference was hosted by the class. Individual students or small groups of students each selected a technology issue and did a presentation on that topic as part of the Technology Symposium. Some students did research-based presentations, others designed and implemented a project related to the selected issue and then presented the project and its evaluation. The Technology Symposium for the GSAMS/WebCT class was conducted via a GSAMS videoconference, and student presenters posted handouts on the WebCT Student Presentations web pages. Students in the WebCT class developed web sites to share their presentations and posted them in the Student Presentations section of the WebCT course Home Page. For those students working on group presentations, learner-learner interaction was an added component of this activity since the students had to use email, bulletin boards, and chat rooms to coordinate the planning, development, and presentation of their Technology Symposiums. As with the Tech Tips, whole class learner-learner and learner-teacher interaction occurred in bulletin board discussions that followed up on the ideas and experiences shared in the Technology Symposiums. Student reaction to the Technology Symposiums was overwhelmingly positive.

Learner-Learner Interaction.

As described in the Learner-Content interaction section, student interaction with content was frequently followed by spontaneous interaction with other students or the instructor on the bulletin boards. At other times, the instructor designed activities that specifically required learner-learner interaction. The purpose of these activities was to provide the kind of interactive involvement that occurs in class discussions or small group work in traditional classrooms. During the early part of the course, the learner-learner interactions began as instructor-initiated discussions on the bulletin board. Each week, the instructor posted several questions related to the readings, and students responded to and discussed these questions on the bulletin board. Frequently, other issues or topics emerged during these discussions as students posted personal technology problems or shared newly discovered technology resources.

After several weeks of heavy bulletin board activity, students reported (on the Online Woes bulletin board, in their daily Technology Journals, and via personal email to the instructor) that they were overwhelmed and frustrated by the enormous amount of material surfacing on the Weekly Discussion bulletin board. Some had difficulty tracking on-going discussions, and others complained that it took several hours daily to keep up with the bulletin boards. The instructor used several strategies to alleviate these complaints. First, the procedures for tracking ongoing bulletin board threads were reviewed on the Course Notes web pages during the fourth week of class. The time issue was more difficult to resolve since the class was

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divided about this problem. Some found the bulletin boards tremendously helpful and wanted them to continue as they were, others just did not have the hours required to handle the volume. To remedy this problem, the instructor divided each class into two sections and assigned students to either Section A or Section B. From that point on, there were two bulletin boards for the Weekly Discussions. Students in Section A were required to participate on the Section A bulletin board, and Section B students participated on the Section B bulletin board. Students could read the other section's bulletin board, but they could not post to it. This cut the amount of required bulletin board reading in half, but still gave aficionados the opportunity to follow the discussions taking place on both bulletin boards.

After students were comfortable with the course structure and the interactive WebCT tools such as email and the bulletin boards, small group projects were assigned. For the first project, students worked in small groups (5 students per group) to design a diffusion plan to support an instructional technology innovation that had been funded statewide in Georgia, but that had failed in the K-12 setting. This assignment followed a two week study of diffusion of innovations, including adoption cycles, adopter categories, attributes that support adoption, etc. The specific technology innovation that the plan focused on was selected as a result of technology adoption concerns that had surfaced on the Weekly Discussion bulletin boards. Group members used email, private bulletin boards, telephone connections, chat rooms, and in a few cases, face to face meetings, to collaboratively develop a diffusion plan. Each group then posted their plan on the WebCt Diffusion bulletin board. Once all plans had been posted, students reviewed and critiqued the other diffusion plans and sent their feedback to the originating group. Finally, students individually emailed the instructor with the changes they would personally make in their original diffusion proposal based on the feedback from other students. Students also voted for the diffusion plan they thought was most likely to succeed. A second small group project activity was implemented later in the course to conclude a several week study on new and emerging technologies, distributed and distance technologies, and strategies for integrating technology into classrooms. This project required groups to design their ideal, technology-supported learning environment and to develop sample lesson plans that would illustrate how teaching and learning would occur in this innovative environment. Students used the same technologies to work collaboratively to complete this task. The GSAMS/WebCT class presented their designs during a GSAMS session, and the WebCT class posted their designs to the bulletin board. Each student was required to read all the designs, and critique them in an email to the instructor. Interestingly, a combination of the diffusion proposals was actually implemented in one school, and one of the technology-supported learning environment projects became the planning framework for a technology magnet school!

Synchronous learner-learner interaction occurred during several online debates that were conducted using the WebCT chat rooms. At the beginning of the technology integration unit, a debate was announced. The debate resolution was: Computer labs should be disassembled and all the computers distributed to individual classrooms. Students divided themselves into small groups (4 or 5 people) and were randomly assigned to an affirmative or negative position. During the next two weeks, groups researched the topic and interviewed teachers, technologists, etc. Groups also interacted via email and private bulletin boards to plan their debate strategies. Prior to the debate, the instructor established a structured point/counterpoint debate format and reviewed the format and general communication protocols with the students. The point/counterpoint format allowed a student for the affirmative to present a point, then a student for the negative was permitted to refute the affirmative point and present a point for the negative. Students were required to post their arguments in small chunks rather than long paragraphs to avoid long time lags. A ... and OVER communications protocol was used to conclude each posted chunk so other participants would know whether the speaker had more to say (...) or was finished (OVER). The initial debate was limited to 30 minutes. Since there were multiple affirmative and negative groups, several separate debates were conducted on the same topic. Following the debate, the instructor posted the debate transcripts on the Course Notes web page. Students read all the transcripts and then forwarded the instructor their personal position on the issue. Each group also submitted a bibliography of resources used to prepare for the debate. A second debate was held a month later. This debate focused on the use of Internet filters in schools. A similar strategy was used, except students were taught to use the private messaging feature in the chat rooms so they could communicate privately with other group members during the debate. The second debate was lengthened to one hour. It included a 15 minute planning time where individual groups met in a private chat area, a 30 minute controlled debate that was identical in format to the first debate, and a 15 minute conclusion where 4 students could

argue concurrently (still using the ... and OVER protocols). Again, final debate transcripts were posted on the Course Notes web page and students submitted bibliographies to the instructor.

Initially, students were apprehensive about the debates and unsure of the chat technology. After the first debate, students were less fearful but some found the chat application to be confusing and chaotic, even with the added structure of the debate protocols (which weren't always followed). However, after the second debate, when students felt comfortable and adept at using the chat technology, they were overwhelmingly positive about the synchronous learner-learner interaction and the activity as a learning experience.

Learner-Instructor Interaction

Many of the learner-instructor interactions have been described in the previous sections. The instructor participated in all the bulletin board discussions, and moderated the online debates. Additional learner-instructor interaction occurred as students used private email to share individual questions and concerns with the instructor. The instructor usually responded to personal email within a 24-hour time period. Students also used email to submit all assignments, including technology journal installments and a concluding personal technology case study. The instructor read and responded to assignments via email, but the heavy volume prevented timely or thorough responses in many cases. Not surprisingly, students responded positively to individual attention when it was available and were frustrated when there was not immediate response and feedback.

Conclusions and Recommendations

Meaningful interaction was achieved in all categories: learner-content, learner-learner, and learner-instructor. This was achieved through the instructor's careful planning of collaborative course activities that were specifically designed to support course objectives. In addition, students were taught to use the interactive technologies (email, bulletin board, chat) before they were required to use them. These skills were reinforced and refined as the course progressed and the students became more proficient in using the technologies. The greatest problem appeared to be the delayed and limited feedback the instructor was able to provide students regarding assignments. With 45 students, the instructor did not have time to respond adequately. In the future, learner-instructor interaction could be improved by limiting class enrollments or providing additional instructor support.

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